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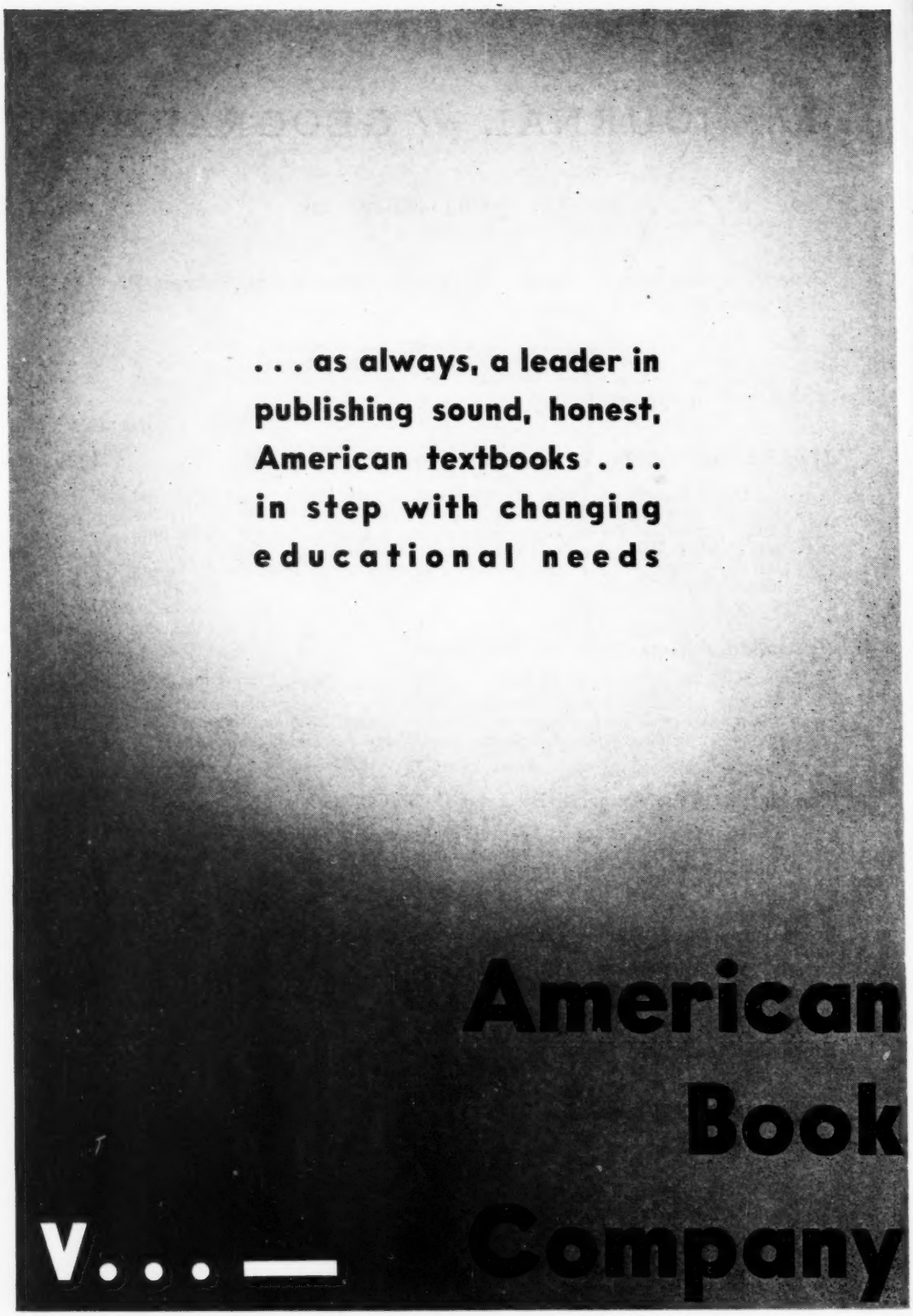
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VOLUME XLIII JANUARY, 1944 NUMBER 1

GEOPOLITIK—SCIENCE OR MAGIC

LIEUTENANT COLONEL SIDMAN P. POOLE, G.S.C.
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GEOPOLITICS PRESENTS ITSELF

Geopolitik, or geopolitics, has swept the intellectual circles of America in the past few years with its chilling blast of infallibility and invincibility. This "made in Germany" brand of thought has inspired some American geographers to write erudite books on its history, its tenets and influence, while others have been moved to present maps of our future world, beautifully and systematically colored, showing precisely how Germany, Russia, Japan, and other powers must, by the omnipotence of natural laws, swallow up Switzerland and Holland and even China. In many circles there has spread an uneasy feeling that whether we like these arrangements or not, this is inevitable; this is Fate. Geopolitik is simply the revealing of laws inherent in natural phenomena like unto gravity or chemical affinity. This new science spreads before mankind the blueprint that charts its destiny.

It is our purpose here to examine this blueprint of infallibility and its implied basis of natural law. This we will attempt to set forth as clearly and concisely as the nature of the subject permits.

Let it be stated dogmatically at the outset that whatever else geopolitics may be, it is not a logical reasoned science; the systematic presentation of a body of natural laws. It is neither geography nor is it political science as we in America understand these terms. And Geopolitik bears the same relationship to political geography as does astrology to astronomy. The only difference is that astrology merely deludes a few individuals while Geopolitik drenches whole nations in blood. A significant difference.

HOW MAY GEOPOLITIK BE DEFINED?

It is difficult to give a simple, clear-cut definition of geopolitics. The exponents of the creed differ among themselves and most of

them have from time to time made pronouncements at variance with their earlier statements. It is apparent that there has been a conscious effort by some to render deliberately obscure the whole subject. German erudition loves to envelop the simple in a veil of obscurity and mysticism and in this the geopoliticians have been more than true to form. Let us, however, attempt to set forth a few of the definitions proposed by the masters themselves.

The first to use the term, Geopolitik, seems to have been a Swede, one Rudolph Kjellén, who greatly admired German political philosophy and German institutions. Writing as far back as 1916 he said, "Geopolitics is the theory of the state as a geographic organism or phenomenon in space." A harmless statement but, as we will see later, it is the germ of much of the whole fabric of geopolitics.

In 1933, Louis von Kobl, writing in the *Zeitschrift für Geopolitik,* states that "(Geopolitics) is national political science." The adjective is significant. This is to be a "German science," not a British or American or French one. It is very much as if we developed a Methodist mathematics or a Presbyterian variety of chemistry!

Another of Haushofer's disciples compares illuminatingly the new geopolitics with the musty and antiquated political geography. "Political geography," he states in the *Zeitschrift* in 1935, "is only the investigation of conditions; geopolitics asks an outspoken dynamic question." The geologist, therefore, who investigates the stresses and strains within a Vesuvius, who with infinite patience measures the composition and temperatures of the imprisoned lavas is at best a poor groper. It is only when he can envisage the dynamic power of the volcano to overwhelm cities and fields and little children that he rises to the full stature of a geopolitician.

Let us consider one more definition taken from the sources and this time let us turn to Karl Haushofer himself; he who has been the master mind of the whole movement. Haushofer is perhaps the most obscure of all the German geopoliticians in spite of his being one of the most prolific. In fact, he apparently glories in obscurantism; one should avoid being clear and lucid; the majesty of geopolitical thoughts is, and of a right ought to be, difficult, shadowy, and distant. Even to the German his language is involved and pedantic. And no European tongue lends itself better to this end than does German.

Occasionally he lapses and becomes understandable, at least

in a carefully worded English translation. He approached nearest, perhaps, to a definition of his subject when he stated: "Geopolitics considers how the state overcomes the conditions and laws of space and makes them serve its purposes." Note, the state (as an organism) *overcomes* laws. Such a statement as that of Haushofer not only indicates his conception of a state's activities but it likewise shows his defiance of all natural laws—the basis of the sciences. It does this in using the word "overcomes." No person, no state, no mechanism overcomes any law of nature. The apple falling, the airplane flying, man reproducing—all do so in strict conformity to gravity and biological laws of inheritance.

The four definitions given above, indicate more or less the scope and aims of Geopolitik as understood by four of its exponents. However, in themselves they no more clarify the discipline than does a definition of philosophy encompass that field. In direct and simple English let us add an original definition which without the pedantry of learning states what geopolitics may be said to mean. Geopolitics, then, is Germany's rationalization of its own variety of power politics, motivated by frustrated ambition and obscured in the shrouds of philosophic mysticism.

Again, let it be said, this is not a science, like physics or chemistry, with an accepted body of laws, procedures, and demonstrated facts. Nor is it magic with some implied wizardry that enables its wielders to direct and control the future with infallible certainty. Rather it is a political platform or program for world conquest. It is conceivable, and by the Germans themselves implied, that there can be as many "Geopolitiks" as there are nations—or, for that matter, as many as there are individuals.

Historic Background of Geopolitik

In order that we may understand something of these definitions and what has grown from them, we must look at them against the long background of history—a history that has conditioned all German thinking and action very strongly. The continuity of their thought processes seems to have changed little, however, differently they have clothed each philosophy or political program as it has appeared with a new jargon of words and a new selection of assumptions.

A crazy quilt of warring, shifting, more or less nebulous Feudal states emerged as the political pattern for Europe after the unity that was Rome was engulfed in the wave of the barbarian invasions.

Much of medieval history, particularly in the later centuries, is the story, on its political side certainly, of the gradual consolidation of the states of Western Europe. By 1648 (Treaty of Westphalia) the England, the Spain, the France of today had been pretty well formed. Only Germany and Italy remained in chaos.

How different all modern history might have been—even that of this year—if a consolidated Germany had appeared on the face of Europe two centuries before Bismarck, William II, and Hitler. Vain speculation!

There were two nuclei—Austria and Prussia—within Germany that strove for unity and national equilibrium. The Teutonic knights in their conquests of the pagan Baltic lands had set a successful pattern for aggrandizement. The Hohenzollerns followed this pattern; the Great Elector, Frederick the Great, William I with Bismarck, and William II with Von Hindenburg. With the exception of the latter ruler, all were successful. And nothing succeeds like success.

With this long drama of history in and behind all their thinking, there is little wonder that the Germans, as is their practice, rationalized the process. They explained and defended their history of aggression by first calling upon the philosophers. From Immanuel Kant, based on his Prussian realism, they derived justification for the development of all internal resources as the one great end of the state. The logical expansion of this into totalitarianism for aggression was a simple step. Later this state must develop and expand. Defense for such action stemmed quite largely from the evolutionary concepts of Georg Hegel. Germany's mission, justified by philosophy and science, came to be one of conquering and dominating Europe; the establishment of a new Holy Roman Empire; the reincarnation of the medieval tradition of universal rule, the Universal Third Reich.

Geopolitics stems back to these philosophers and the various political schools that grew out of their writings. Amongst these might be mentioned those of Generals Karl von Clausewitz and Friedrich von Bernhardi and of Heinrich von Treitschke. It is to Clausewitz that the German army doctrine and its deep appreciation of terrain may be most directly traced. Rightly has he been called the Patron Saint of Prussian Military thought.

In one way or another all of these writers expounded and defended a political philosophy that came to be known generally as Pan-Germanism. On the genealogical tree this Pan-Germanism is

the mother of Geopolitik. The sire may be said to be Friederick Ratzel and geographic determinism.

If we are to judge by his influence on thought and history, Ratzel was one of the greatest geographers of the 19th century. He traveled widely in Europe and North America and became convinced that the philosophic theory of determinism was demonstrated by the facts of geography and history. Briefly his theory of geographic determinism is that geographic conditions *determine* or unalterably control the occupations of peoples and the history of nations. He tells us that "an area . . . always transmits the same impulse to states and nations just as a stream enters a turbulent section of its course, or resumes its quiet, even flow at the same location." This to the average American reader sounds harmless. But it is to be understood not as metaphor or poetry, but as a philosophic truth and one that explains all human actions. It is as if we held literally, as we do that two plus two equals four, that the people of the Argentine are largely wheat farmers because of the rich soil, the flat terrain, and the optimum conditions of rainfall and temperature that prevail. Nature, by its complex of resources, determined that the Argentino of the Pampas should be a wheat farmer. It is beside the point that economic considerations, technological advances, and racial and cultural inheritance are neglected by this argument.

Or to cite a second example. Nature endowed Russia with vast spaces and cold winters. When Napoleon's Grand Army entered this "turbulent section of its course," it was predestined by geographic facts to the ultimate ruin of its retreat from Moscow. This is to neglect entirely the failure of his own quartermasters, the bloody defense at Borodino, the holocaust at Moscow and the skilled handling of the Cossacks. But no matter; we must be logical and geographic determinism can and is held logically and tenaciously by all good geopoliticians.

SOME GEOPOLITICAL CONCEPTS

Let us look at some half dozen of the chief concepts that are the gist of Geopolitik. While they are woven into a crazy quilt of propaganda rather than a closely knit mosaic of science, they are none the less terribly significant.

1. *The State is an Organism.* Out of the theory of geographic determinism and the evolutionary doctrines of Hegel, the geopoliticians developed one of their basic ideas, namely, that "the

state is an organism, subject to the biological laws of growth and decay as are all organisms." To many, if not most of us, such a concept hints of state deification and of a mysticism which we may possibly *believe* in but which we find very hard to *understand.*

To the geopolitician there is a "spiritual connection" between human beings and the land they live in. As an organism a state *must* grow—or die. Therefore growth (that is, expansion, conquest, extension of frontiers) is a natural, unavoidable process. It is simple evidence of a good state of national health. The periphery of a healthy state is always a temporary thing anyhow. Its frontiers may be lines of defense or lines to rest behind temporarily until the state is urged forward again by its inner vital force—much as an amoeba gropes impulsively outward for its bits of food.

Such a "perfectly natural, healthy and unavoidable groping, impelled by inherent laws of the state-organism," was Germany's conquest of Poland in 1939. Such a "perfectly natural, healthy and unavoidable groping, impelled by inherent laws of the state-organism" is the present conquest (sic!) of Russia. Perhaps the significant difference is that the amoeba-state in the latter case absorbed some indigestible matter and is suffering from a naturally induced stomach-ache.

2. *The Heartland.* One of the most fateful and dynamic concepts of the geopoliticians is not original with any of them but is derived from a great English geographer, Sir Halford Mackinder. Mackinder, as far back as 1919, writing while the Versailles Treaty was being born, developed his idea of the "Heartland." Haushofer's school, finding it useful, took it over, naturalized it into German, and incorporated it into their blueprint of geopolitical strategy for world conquest.

The Heartland is a strategical concept, laid down on world maps as the core of the World-Island; Eurasia plus Africa. Rather indefinite are the Heartland's boundaries, but they approximate those of East Europe and Siberia or roughly the Soviet Union. Surrounding this "Pivot Area" is an inner crescent of marginal lands; west Europe and the monsoon lands of India, China, and Japan. Beyond these lies an outer crescent; Great Britain, the Americas, Australia, and south Africa.

Now, say the geopoliticians, there is a natural conflict between the Heartland or Pivot Area, which is wholly continental, and the outer crescent, which is entirely maritime in its history and vision.

Germany—in the inner crescent—shares in the greatness of both the other areas. All it has to do is to "organize" the backward Slavs and the resources of the Heartland to Germany's ends—and the sea powers will go down in the struggle for world dominion. They quote, believe, and blindly follow, this saying of Mackinder's: "Who rules East Europe commands the Heartland; who rules the Heartland commands the World-Island; who rules the World-Island commands the World."

The practical effect of these ideas is seen in Hitler's striving for the oil, the wheat, the manganese of Russia. A fanatical belief in this concept of global strategy led his legions to the blood stained suburbs of Stalingrad.[1] And yet it is still Russia that "rules East Europe." But this does not mean that the U.S.S.R. will command the World-Island or the World. All of these semi-mystical ideals to the contrary, if we of the United Nations can be as determined as the Nazis, we and not Hitler's gangsters will dominate this world. Over against Geopolitik's concept of the Heartland we will put the concept of greater oil and iron and coal resources and the solid reality of greater manpower. And over against a mystical fanaticism we will place the deeply rooted ideals of freedom-loving democratic peoples. And always let us remember we are fighting mere humans and neither magic nor science, neither natural laws nor an inexorable Fate.

3. *Lebensraum* (*living space*). Neither Haushofer nor any of his geopolitical group are responsible for, nor do they devote much attention to, the perverted German theories of racial purity and superiority. They do, however, accept these principles and view the Aryan German as a race elite—a caste of European supermen. They admit unquestioningly that these supermen need more Lebensraum—living space—than they have. This, to them, is not a wish or a desire only, but a *right* that is incontrovertible, perfectly natural, and inherent in the biology of states. Comparing their greater birthrate and population density with those of Latin France, they argue that there is room west of the Rhine for Germany's future generations. They fail to consider the Soviet birthrate (43 per 1,000 as against 19 per 1,000 for Germany) as proving equally well the Slavic "inherent right" to appropriate German soil for their future generations.

[1] It is only fair to note, however, that Haushofer damned with faint praise the German march of 1941 into Russia.

4. *War is the Norm for Powerful States.* With the geopoliticians' theory of Lebensraum as a *right,* German territorial expansion becomes inevitable. Expansion means war and war is accepted and glorified as normal and desirable. Says one of their writers: "Constant strife and fighting are the phenomena of the life of states. The claim to additional space rests upon natural law." Or again: "The concept of war must be placed in the center of the whole training of youth. To awaken and cultivate the heroic sense in our population is our first and foremost task." Similar quotations might be multiplied. They indicate, first, the mystical current in their thinking and secondly, a keen sense of how to attain their ends. How successful they were in educating for death, is apparent in Europe since 1939.

5. *Autarky—a Totalitarian and Self-Sufficient State.* War being desirable as well as inevitable, and Lebensraum a heaven-descended right of all Germans, and the Heartland or Pivot Area awaiting its fate, it behooved the geopoliticians to have a convenient theory for practically achieving the inevitable ends. This they do by their theory of Autarky or the totalitarian state. In order to fight successfully, a state must be able to live indefinitely on its own resources. All freedom of individuals must be sacrificed to the freedom of the state—to carry on its inevitable wars of conquest.

All of this involves space-planning; the most detailed and accurate studies of the position, resources and peoples of neighboring states who are awaiting their inevitable fate of being swallowed up. Total control over the lives and activities of all people within a state is necessary—and hence a Dictator—Mr. Shickelgruber. All of this is perfectly logical—granted its premises—and we must admit gives such a state real advantages in carrying on a war.

It is significant that the geopoliticians have never presented a program for their peace—other than domination ad infinitum.

6. *Blut und Boden* (*blood and soil*). Slogans and clever propaganda, the movies, and radio—all have been well used by the geopoliticians in spreading their ideology. One of the slogans which has made particular appeal, Blut und Boden (blood and soil), summarizes one of their theories. The phrase is dynamic and almost irresistible in its appeal to Germans.

It appeals to them because it epitomizes on the one hand the Prussian pride of race—Blut—and on the other their history-long greed and lust for lands and power. Attempting to be scientific, there is claimed for Germany all land where Germans dwell. They

admit—grudgingly—to differing degrees of rights to the world's lands. It is as if they claimed Germany itself 100%; Austria, perhaps 98%; Alsace Lorraine 90%; and Holland (but partially Nordic-Germans, poor folk) only 80%. They might even set up a 50% claim to Milwaukee! For where German blood is, there is German soil.

That such claims are realities to the geopoliticians and not the dreams of a few fanatics can be seen from a study of some of their publications—especially their maps. The Germans, by the way, have long led the world in the making and use of maps. When they have used them for propaganda, they have been particularly effective.

In an atlas of 1900—before the day of geopoliticians but used by them—there is shown amongst other similar things, a band of German Nationals living around the west shores of Lake Michigan to the apparent exclusion of all other Americans. And amongst the largest eight German cities are listed both New York and Chicago. When this is seriously put forth by German geographers for German schools, it is little wonder German youth has grown up believing it to be literally true. All of this sometimes makes our American geographers wish that they were listened to with equal respect.

HAUSHOFER AND HIS WORK

Major General Professor Doktor Karl Haushofer is the prophet and guiding genius of Geopolitikers—as Strausz-Hupé calls them. Haushofer was born in 1869 at Munich of a long line of scholarly ancestors. He served in the Army on the Bavarian General Staff and spent many years on military missions in Japan and Asia. After World War I he became professor of Geography and Military Science at Munich.

He is learned, a clever organizer, a natural journalist, and has a keen sense of showmanship. Thru numerous books and pamphlets and particularly thru his journal, *Zeitschrift für Geopolitik,* he has for a long while had a wide influence on German political thought and actions. Thru Rudolph Hess, his warm disciple, he has with little doubt definitely influenced Hitler and the Nazi inner circle. It has been well said that while "The Nazi war machine is the *instrument* of conquest; Geopolitik is the *master plan* to tell those who wield the instrument what to conquer and how."

Haushofer is not particularly original and he is certainly diffi-

cult and obtuse—even to Germans. It is told that his daughter admitted she couldn't understand his writings. He himself advises his followers not to be too clear and definite. Again, perhaps a touch of mysticism—if it isn't Houdiniism. But whether his program is magic or science, he must not be despised, derided, nor overlooked.

He has gathered around him a group of geographers, ethnologists, historians, political scientists—any and all who could contribute—a group that has served Nazi Germany as an extra super General Staff. What a reservoir of facts necessary to military planning this group has produced, no one but the German leaders know, but it is certain that it is enormous. From this mass of facts has been drawn the master plan of world conquest, the attempted execution of which we are now watching. Sometimes "the best laid plans of mice and men gang aft aglae."

It is impossible to state exactly how much direct influence on the aims and methods of the Nazi leaders the geopoliticans have had. It has been thru Haushofer's disciple, Hess, that they had the ear of Hitler himself. The removal of Hess may have checked somewhat their influence during the last year or two. Certain it is that the invasion of Russia was a blunder from the geopolitical viewpoint.

Geopolitik, in one sense, has been the bridge that spans the period from the scholarly objectiveness of German political geographers of earlier decades to the hypocracy, cant, and prejudice that marks the propagandist, masquerading as a scientist, in the Germany of today. Clothed as their writings have generally been in the form and with admittedly much of the substance of science, and dignified as their group has been with the names of many reputable writers, it is not surprising that amongst a large section of the "intelligentsia" geopolitics has had a strong following. Wide and deep during the last two decades has been the spread of Geopolitik among the officers of the Army. General Haushofer could and did speak their language and this gave great prestige to Professor Haushofer when he pronounced ex-cathedra his scientific truths. Appealing at once to the German's respect for learning, his military tradition of conquest, and his love of the mystical, it is little wonder that these young officers enthusiastically adopted a philosophy that appeared to rationalize their desire for revenge over the perpetrators of the Versailles Treaty. And the Lieutenants and Captains

who flocked to Haushofer's lectures in the '20's are the Colonels and Generals of the Nazi host of 1939-43.

THE AMERICAN ANSWER TO GEOPOLITIK

What shall be America's answer to this geopolitical creed; this creed which is such a clever synthesis of mystical faith with a great wealth of geographic and other facts—carefully selected? How can there be any answer but submission to a people alone armed with an invincible, tho mayhap black magic, and with a science which, tho not quite understandable even to its own devotees, is, we are assured, as infallible and omniscient as are the laws that govern the swing of the planets thru space?

The first simple and direct answer to all this is the American Army and Navy. These may possibly be defeated by superior guns and ships but will not be hypnotized by false assumptions and logic masquerading as Fate. Geopolitics is conveniently clothed in a veil of Mysticism. Mysticism is the Esperanto of ghosts; and the American Army and Navy do not understand Esperanto and they are not afraid of ghosts. Guns and ships and planes are clearing away this veil which obscures a very dangerous but false magic and an equally incredible science.

A second answer to German geopolitics must be that of American geopolitics. This must be a geopolitics devoid of all mysticism, with no pretense of being supernatural magic or unanswerable science. But in a total global war between democracy and slavery, the forces of democracy must and can present a clear-cut analysis of world theatres that will serve as a basis for planning, both for the war and the peace that will follow. American geographers, humbly perhaps but devoid of any inferiority complex, must assemble the vast complex of facts necessary for these plans. The lands and peoples, their mineral and agricultural resources, their distributions and aptitudes, must be made known to our leaders as thoroly as Haushofer's Institute has made these known to Hitler's henchmen. We in America have too long neglected this whole field of professional geography. Too often we have left such tasks to the devoted, but inadequate mistress of the "little red school house" or to the pleasing and colorful pictures in some of our delightful travel journals. We must awake to the necessity of utilizing the high scholarship of those amongst us skilled in interpreting earth relationships and who understand as well as do the Germans the nature and

utilization of ores and fuels, of soil and climate. And America is doing just this; it is writing its own geopolitical program in answer to the creed of Haushofer. Newfoundland and Trinidad, Guadalcanal, and North Africa are in a very real sense a part of this answer.

Finally, there is a third answer America must make to the "Zauberei und Wissenschaft" of the German geopoliticians. Tho nowhere do these plan for anything but war, we must go beyond them and plan for peace. After burning up the geopolitical blueprint for the totalitarian slave world of the future, we must submit a plan of our own.

This blueprint of ours may not be as clear-cut as the German. We are not so logical—but more humane. We are resolved to erect a world of peace and economic security, of justice, and freedom. And the Germans have taught us one lesson. This plan of ours must not be purely idealistic, but must be founded and imbedded in the hard realities of this world and its people. Here again American geopoliticians must keep constantly before our people the grimmer facts of the planet on which we live. The sweet dreams of pacifists and isolationists must never again be allowed to lull the democracies into slumber that results in the periodic blood paths of reoccurring World Wars.

Just what this future world plan will be is by no means altogether clear. It must evolve as time and circumstances permit. It may be compounded of the League of Nations, the Atlantic Charter —and perhaps some of the Gettysburg Address. But whatever form this blueprint finally presents, it is certain that it will visualize a better world to live in than the one envisaged by Haushofer and his disciples.

A last word—it must be remembered that peace will need preserving as well as the war winning. This is a realistic world where power alone can preserve the right. Let us all resolve that we will do our bit to keep America right—and strong enough to enforce that right.

MAP READING

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Ithaca, New York

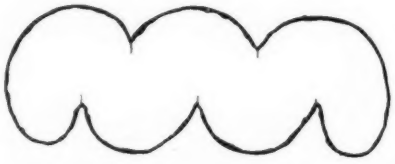
LESSON V. FLAT MAPS TELL LIES—IF YOU LET THEM

So far we have looked mostly at globes. As you know, the globe gives us our only true idea of the earth. This is because a globe is of about the same shape as the earth. On the globe the land areas are the correct size and the correct shape; directions and distances are exact. There are several reasons for not using globes entirely. Most important—a globe is a clumsy piece of equipment. A sixteen or twenty inch globe such as we have in our classroom can't be picked up and carried around easily. In the second place, globes are necessarily on a small scale. On a sixteen inch globe one inch represents 500 miles. Suppose we wanted to show the earth on a scale one inch to 100 miles. We would need a 64 inch globe which would be 200 inches around. Think of trying to find a place to put it! Then globes are very expensive. Even the small ones we have are carefully put together by hand, and they cost between thirty-five and fifty dollars. These three reasons are enough to show why we can't always use globes. We need flat maps, too.

Flat maps that we can roll up, carry around, hang on a wall are very convenient. They can be made on a large scale, and they are cheaper than globes. With all these advantages it's too bad that they aren't perfect. But we might as well face the facts right now. There is no such thing as a completely satisfactory flat map of the whole earth. It is impossible to make one. Every flat map of a large area has something wrong with it. On some of them the land areas are all stretched out of shape. On others we can't use a scale. On some of them the land or water areas are squeezed together.

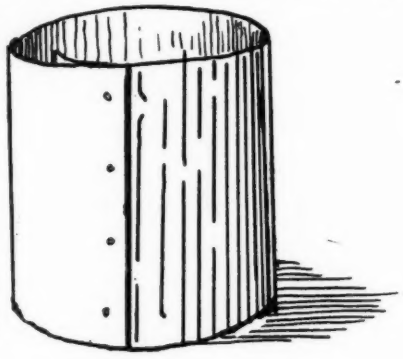
Why do you suppose this is true? Well, it all goes back to the shape of the earth. We know that the earth is a sphere, or "round all over." It is the shape of a ball, an orange, a basketball, a globe. (When we compare these shapes we must try to remember how many hundreds and thousands of times larger the earth is.) The geometry men tell us that a sphere is not "developable," which means that it cannot be flattened out. Now is a good time to prove this again by "peeling the orange." Try your best to flatten out the

skin without breaking it. Can you do it? Probably your orange skin looks like this:



The fact that a sphere cannot be flattened out means that every *flat* map of the sphere has something wrong with it. In order to read flat maps intelligently we have to be able to see what is wrong with them, and then take that into account.

In this lesson we are going to see some of the ways people have tried to make flat maps of the earth which isn't flat. Geographers have worked and worked on this problem, and hundreds of different kinds of maps have been made. Each one is good for some purpose. We will look at a few of the common ones. The main problem in making a map is to get the two sets of lines we've learned about. Once you get the lines of latitude and longitude drawn, you can fill in the areas because we know the location of so many places on the earth. These two sets of lines are called by many names. *Network* is one. The army maps call this network of lines a *grid*. Geographers call the lines a *projection*.



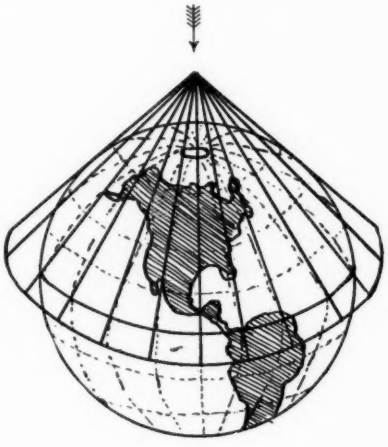
Perhaps the easiest way to make a map of the world is to use a piece of paper in the shape of a *cylinder*. You can make a cylinder by fastening together two opposite sides of a piece of paper. It will look like this:

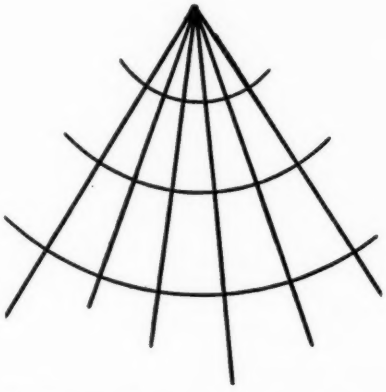
If you have a large cylinder you can fit it over the globe so it touches at the equator. Then if you had transparent paper you could trace the parallels and meridians on to the paper.

Then you could cut the cylinder open and lay it out flat. The lines would look as they do on the figure. Can you see what is wrong with this system of lines? Exactly. The meridians are the same distance apart at the north and south poles as they are at the equator. In fact there isn't a north or south pole on this map.

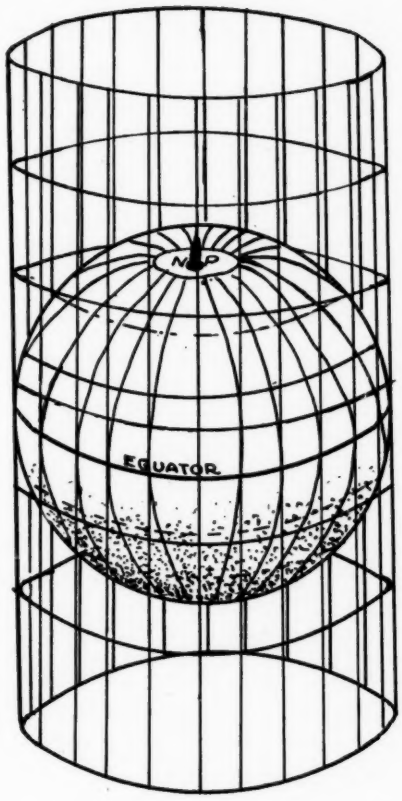
And what happens to land at the far north and south? It is stretched out way too much. ⟿

Another easy way to make a map is to use a piece of paper in the shape of a *cone*. You know that shape certainly. You can roll a large sheet of paper into a cone and lay it over a globe. It will look like this:

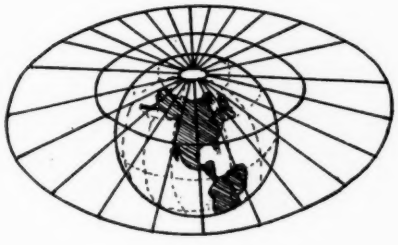




Still another way to get a projection is to take a flat piece of paper and lay it on top of whatever place you want in the center of your map. You often see maps like this with the North Pole in the center. ⟿



Notice that the cone doesn't fit at the pole and the equator. It does fit at the sides for a distance. If you copied the lines and unrolled the cone you would get a network of lines looking like this: ⟸



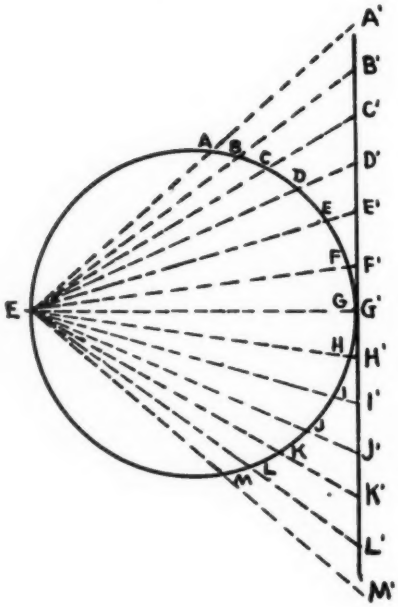
Looks complicated, doesn't it? But it isn't. Try it. The parallels are all circles with the same center. The meridians are like spokes of a wheel.

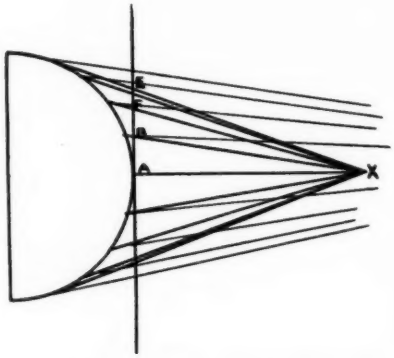
We'll study these projections more in detail later on. Let's spend a minute now on some other ways to get the network for a map. For maps of half of the earth or less the geographers often use a camera. It's a "pretend camera," for it's all done with numbers really, but we'll just get the general idea. Have you ever seen a snapshot of a man where he looked like ⟿

Or like this? ⟿

The magazines often show trick shots like these where a man's feet look too big, or his head is too big. You see, the camera shows whatever is closest to it bigger than what is farther away. If his feet are close to the camera and his head six feet away we get a very funny "out-of-shapeness." This "out-of-shapeness" is called *distortion.*

When we try to take pictures of half a globe, we get much the same sort of results. ⟿





Ask your teacher to show you the *Fortune* maps of the Atlantic and Pacific Arenas.

If we pretend that the camera is on the opposite side of the globe from the one we want on our map, we get lines like this:

⟿

Geographers also make projections putting the camera (pretend) in the center of the earth and at various distances from the earth, but distortion (out-of-shapeness) occurs in all these projections. It isn't necessary to learn how these maps are made or even what their names are. It is necessary for you to understand a few simple facts.

1. A perfect flat map of the earth cannot be made, because the earth is a sphere.

2. All flat maps have some distortion. Some show north and south regions too big; some squeeze the land together in the middle; some pull land areas out of shape.

3. Geographers use cylinders, cones, and planes in an attempt to make maps. They also use an imaginary camera in an attempt to get a network or projection on which to draw the land.

4. A projection is any orderly system of parallels and meridians on which a map can be drawn.

AUSTRALIAN FORESTS

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Most Americans have read about the Australian bush, but many of them, once they reach the far away continent, are inclined to remain in the cities. Impressed by the well-planned urban centers, they stay in them rather than go to the interior. Australia invites us to share its bushlands and the wonders of a generous nature as well as its cultivated gardens.

In the springtime the Australian bushlands are masses of golden wattle, the unofficial Commonwealth flower-bearing tree. It and other flowering trees are unusual. Blossoms of the gums, especially where there is an open stand like in western Australia, vie with the wild flowers that are found among them. Gum blossoms shade from the dark creams and yellows into pinks and reds. As many as four hundred different kinds are found.

Plant life in Australia is almost as interesting as is the animal life since the gums as well as the marsupials have adapted themselves to a variety of conditions. Certain species are found where it is relatively warm, while still others are found above the snow line. Some are grown where it is dry, others where it is wet. Naturally, the most dense stand of trees is along the narrow rainy coastal plain rather than inland where there is but little rainfall. The largest trees are seen in Victoria. The boulder-strewn foreshores covered with virgin scrub-stunted vegetation shade into the darker gum clad higher slopes. The bark on these trees also differs. It is likely to grow more smooth as the tropics are approached.

One writer has said, "The bush stretching inward as far as eye can see is as monotonous as is the sea and as silent as the sky." While riding along the edge of the desert, travelers say to themselves, "Now we most certainly must be out of sight of all vegetation." Generally, however, low plants of the gum variety are seen in the distance. These sturdy plants range from dwarf-like bushes to trees nearly five hundred feet in height. Often they give an impression of fertility that does not exist. The trees conserve the moisture from the pale earth. With the restless edges of the long narrow leaves toward the sun, they hesitate to fall. The coloring of the gums, with their trunks smooth or shaggy, remains about the same thruout the year except that the young leaves are likely to be more reddish in springtime. The ornamental and the useful

blend in perfect harmony when in springtime the red tips of saplings are used in floral arrangements.

The larger trees are ring barked, branded with deep circles to check the rising of the sap. Suckers are also removed to prevent additional growth. Drained of life the trees become white skele-

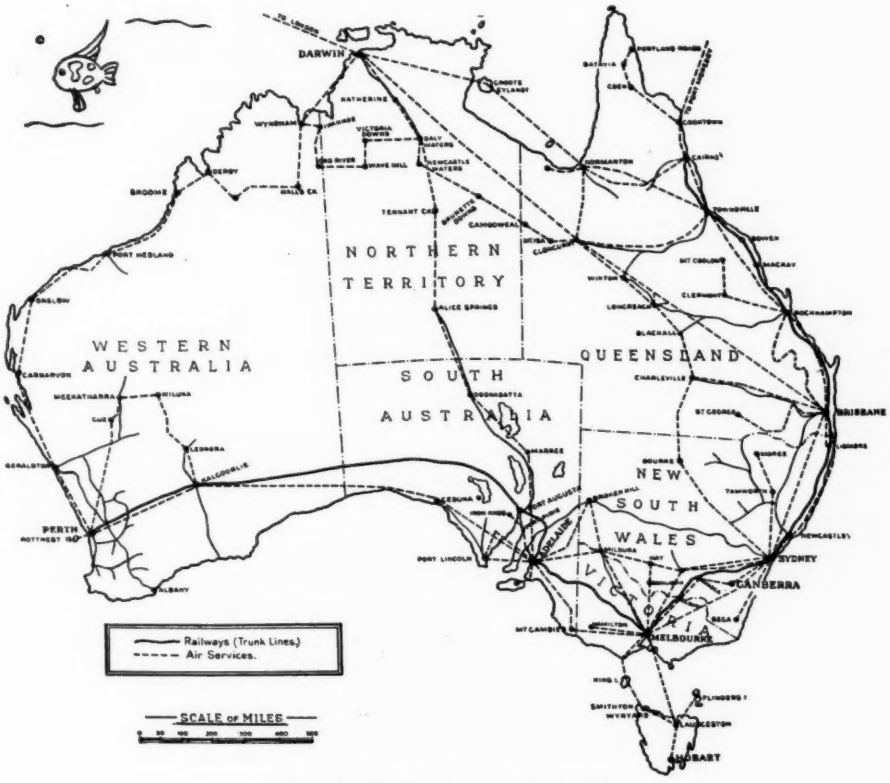

Fig. 1. Sketch map of Australia.

tons. They are marked to fall in order that the grass for sheep may have a chance or that the land be made available for cultivation. Gums awaiting the ax of the settlers, with bits of bark hanging, help make the landscape appear ragged and ill-clothed. Often the naked trees with their bark peeled are cut one by one as they are needed for firewood. Once the stumps are grubbed, the land should be allowed to stand for a few years if the sour soil is to produce well.

A splendid collection of Australian timbers is on display at the School of Forestry in Canberra and in the Technological Museums

in both Sydney and in Melbourne. For many years Australian hardwoods have been used in the paving of streets in London. A cubic foot of the grey bark will weigh seventy pounds. Only within recent years have Australian timbers been used at all extensively for furnishings, even tho there are few woods that can surpass them in beauty as well as in durability. A factory in Annandale, New South Wales, makes pianos. The hardwood used has a high commercial value since it takes a beautiful polish. The ten buildings of the Annandale Company cover many acres. They have their own timber mill, pattern department, joinery works, paint shop, and polishing and drying rooms.

After seeing dozens of articles made from mulga wood in the shops, naturally, we must be interested in its source. Mulga is found in central Australia. Alice Springs is in the heart of the mulga area. Mulga is also produced along the west coast south of Broome. Not far to the north and west of the mining town of Kalgoorlie are the karri forests. Karri trees sometimes grow to a height of three hundred feet. They may be from six to twelve feet in diameter. Their straight beams are very strong. Durable railway ties, bridge piles, and fence posts are made from these trees since the wood is so hard that it will stand water for years without rotting. It resists both fire and white ants, but requires treatment to make it termite proof. The cutting and exporting of karri timbers of which there are about 150,000 acres is an important industry. Karri trees are considered by some people the most important of the gums.

The story of the jarrah is told by James Pollard in *Walkabout* for June, 1941. The parrah is a stringybark eucalyptus, a gum tree with a dark grey fibrous bark. It is not as well known for its beauty as are some of the smooth-barked eucalyptus—the sugar gum, the lemon scented, the salmon gum or the karri. What it lacks in color, however, is made up in stateliness. An observer forgets that the trunk and limbs of the jarrah are grey and the leaves a dull green.

The jarrah country lies in the southwest corner of Australia, south of Perth. It covers an area of approximately 13,000,000 acres in the twenty-five to forty-five inch rainfall belt. Really prime forests are found on only a little more than a fourth of the area—a belt some twenty miles wide and two hundred long bordering on the Darling Range. This forest, where many trees stand isolated, is Australia's most valuable forest of hardwoods. Certain areas of state forests in Western Australia have not yet been opened. In these one may walk among jarrahs that reach upward from a

hundred to a hundred fifty feet. Trees of this type give straight clean logs. Their reddish color led to their being called mahogany in the early days. "Jarrah," the name by which they are now known is an aboriginal term. Even tho it is considered fire as well as termite proof, it will burn.

Jarrah loggers generally work in pairs. Many logs are now being taken from the forest by tractors. Horses were once used but never many bullocks as in the other lumbering regions of Australia since the jarrahs grow on the more rugged land.

Fig. 2. Eucalyptus and ferns near Melbourne. Courtesy Australia National Travel Association.

The 341,629,826 cubic feet of timber exported from Australia has been made up very largely of jarrah and karri. In addition to railroad sleepers, the exports have included street paving blocks, telegraph post arms, and bridge and mine materials. In 1938 as many as 2,051,735 cubic feet of sleepers were exported. They were sent to New Zealand, Mauritius, and other Pacific Islands, Malaya, Ceylon, Iran, Africa, Cyprus, Belgium, Netherlands, Germany, the United Kingdom and the United States. The eastern states of Australia import large quantities of hardwoods from Western Australia. Streets in their capitals are paved with jarrah blocks, and railroads, including the Trans-Australian, are built in part with jarrah ties. Jarrah timbers were used in the Tilbury Docks in London.

The western Australian government passed a Forests Act in 1918 setting aside three-fifths of the revenue made on forests for forestry purposes. For eighty years previous to this time, forests had been exploited in Western as in all other states of Australia. Since the writer is most familiar with conditions in the forests of New South Wales, they will be considered in detail. What is said about the coastal areas there applies to the low lands in other states, except that the forests of North Australia and Queensland have not been exploited so extensively as have those of New South Wales.

New South Wales

Forest growth in New South Wales is very definitely related to the natural belts that lie more or less parallel to the Pacific. We could expect the trees to be most dense near the coast where the rainfall is heavy. According to the "Handbook on Forests" forty per cent of New South Wales has rainfall amounting to less than fifteen inches. There, forest growth is almost impossible except under irrigation. Another doubtful region covers nearly twenty per cent of New South Wales where the rainfall is from fifteen to twenty inches. The growth of trees there is likely to be sparse. In over twenty-four per cent of the state the precipitation is from twenty to thirty inches yearly. Where the rate of evaporation is great, forest growth is not to be expected unless the soil is good. Where the rainfall exceeds thirty inches and where other conditions are satisfactory, dense forest growth is possible. Such conditions exist in about sixteen per cent of New South Wales.

Largely because of variation in the soil and topography prime forests are not continuous along the entire coastal area, but there are fair to good forests from the Victorian border to the Tweed near the Queensland border. This belt is from ten to fifty miles wide. Many trees are still standing but due to the fact that it is the most closely settled area in Australia, many have been cut or burned. Occasionally stands many be found where one specie dominates, but generally the forests are mixed. A high yield of one class of timber is rarely available. For this reason few large saw mills have been built. There is almost a complete change from the southern to the northern ends in so far as kinds of trees are concerned. Usually, the more durable growth is found to the north. Spotted gums which are especially durable and desirable have been cut. Some of the finest trees are found between the Hawkesbury and the Tweed, where the rainfall is about fifty inches yearly.

When discussing "The Land of Big Timber" in the November, 1941, *Walkabout,* John H. Kent says:

> Bullocks are better for working in damp places than are tractors since the grips slip. Working bullocks have to be "broken in" to their positions in the team. Once a hauler gets a team together, he values it highly. Generally fourteen to sixteen bullocks go to make a team.
>
> The cutters select their tree and "brush" a track from it to the edge of the scrub. This track is to facilitate haulage by the team. Special brush-hooks with long handles and very sharp curved ends, much like a reaping hook, are used to clear tracks.
>
> Timber standing on the Atherton Tableland is estimated at 3,000,000,000 cubic feet. Red tulip leads with approximately 700,000,000 feet, karri pine 200,000,000 and maple and silky oak 100,000,000 feet. The latter timbers are used in the veneer trade.

Rain forests, often called "Brushes," are interspersed among the eucalyptus forests. They occur largely in small patches along gullies and water courses. One of the best known Brushes is on the Illawarra, south of Sydney. The Brush between the Richmond and the Tweed is outstanding. These red volcanic grounds were worked by early cedar gatherers. Here also was rosewood, teak, white birch, and the large black bean. There was a lumber mill on Liverpool Street in Sydney as early as 1850. Since trees were of little commercial value, the demand for their products was not great. Australian woods are appreciated now. Cedar is used for motor bodies, furniture, and as a finishing wood—the most valuable in the southern hemisphere.

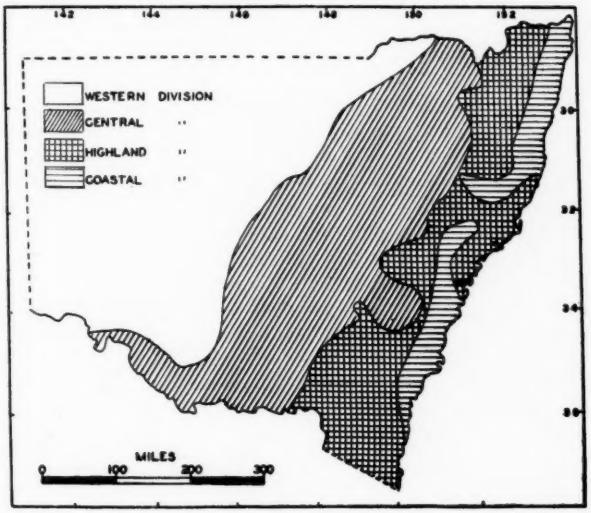

Fig. 3. The forest regions of Australia.

Hardwood forests are found in the highlands running parallel to the coast. The northern section of the highlands known as the New England Massif is separated from the Central by the Hunter River and the Central from the Southern by the Shoalhaven. The Central Highlands with their heavily wooded Blue Mountains west of Sydney are well known to tourists. They reach toward the coast for about an equal distance both north and south of Sydney. Mt.

Kosciusko, near the Victorian border, is the best known peak in the Australian Alps. The trees in these Southern Highlands are variable. Generally they are inferior to the soft woods along the coast. The best stands are found where there are as many as forty inches of rainfall. Where the quality of the soil changes from light to dark and from shallow to deep, the species vary. Low grades of lumber are found in greater quantities than are the high. First class forests grow on a narrow strip of highlands but the quality decreases rapidly. Since graziers look upon any groups of trees as a hindrance to the growth of grass, many have been cut.

Where undergrowth is likely to be found in the coastal forest, a grass covered floor is more commonly found in the highlands. Tree ferns are not uncommon along the east edge of the highlands where the soil is favorable. The lumber value of this belt is relatively low. Some native as well as American timber is used for mine props. The cost of transportation in the mountains is out of proportion to the quality of lumber grown. Since the grade is poor, forest management and the erection of first class mills have not been justified.

Even tho there is less rainfall in the Central than in the Highland Division, the forest growth more nearly contributes to the needs of the people than it does in the former area. The more desirable trees have been cut as pasture lands were needed. The red gum is found along the Lachlan, the Murumbidgee, its largest branch, and the Murray. It sometimes yields poles reaching to a length of sixty feet. In general, however, they are short but fairly large in diameter. Lumber from these trees when used for railway sleepers may wear from twenty-five to fifty years. As a result of lack of foresight cypress railway sleepers must now be brought in to certain sections from a distance.

In the Central Division the timber has kept down the grass and reduced the carrying capacity of the land for sheep and cattle. With the spread of wheat farming, the density of population increased. Since the supply of lumber seemed inexhaustible, clearing took the place of ring barking, especially among the cypress trees. Early settlers did not think of the forests as a potential source of wealth, and as a rule the best land which was heavily timbered had to be cleared before it could be cultivated. Attempts to supply the lumber needs of the people increased with the growth of towns. Manufacturing created a demand for lumber. People had a feeling that trees grow much more rapidly than they do, for instance they believed that in twenty years a cypress tree would be thirty inches

when actually it measures much less in circumference. Firewood is today so plentiful that fuel can hardly be disposed of at six pence a ton.

The Western Division of New South Wales does not enter into lumber production except to produce fence posts and firewood. A few of the smaller species of trees are used as fodder.

GOVERNMENT CONTROL

The first step toward government control of forests came to New South Wales in 1839 when those engaged in obtaining timber from vacant crown lands were required to hold licenses for which they paid a small sum. Later they also had to pay a royalty on the timber removed. Rules were especially difficult to enforce in outlying areas far from commissioners who issued licenses. New regulations passed in 1850 required all of the workers including the fellers, cutters, and splitters, as well as the leaders to hold licenses. In 1871 the first timber reserves were set aside. Until this time anyone who cut a tree regardless of its location owned it. Further legislation was passed in 1877. As each new issue failed, another was substituted.

Thruout this earlier period no attempt was made toward forest maintenance or conservation. The cutting of trees was all a matter of revenue without regard for the welfare of the forests. Even today there are very few trained foresters in Australia. Forest management is largely a matter of future development. After fifty years of exploitation there developed among timber getters in New South Wales a tendency toward roving. Activities of these men were not easily adjusted to suit the management of forests and the more satisfactory cutting of mature trees. Now the trend is toward the preservation of all the useful growing trees. Forests need to be thinned; gums, especially the young trees, demand room. If necessary space is not provided, there is a marked falling off of vigor.

The price of standing trees varies with the location. Hardwoods have sold at such a low price that it did not pay to remove them, let alone kiln-dry the wood. Flooring from some of these woods should cure for a couple of years in the open before it is thoroly seasoned. Hewers and haulers average good wages even at present prices. Hardwood railway sleepers, eight feet long and four and a half by nine inches in size, sell for about a shilling each. Australia produces large quantities of the best of hardwoods, but the supply of soft has not been sufficient to meet the demands. It has been rela-

tively easy to bring American and Scandinavian soft woods to centers of population like Sydney, where within a radius of one hundred miles nearly half the people of the state are found. Even tho Australian woods serve many purposes, there has been no substitute for American soft and ply woods. Each year the soft wood imported is valued at more than £8,000,000—5 times the value of the lumber exported.

Since the demand seems to be for soft woods, the most intelligent thing to do is to set conifers that will bring not only higher returns but also the grade of wood desired. The market at best is not extensive, there is little demand for second grade products. Thus far much of the work in lumbering has been carried out on the basis of filling orders. Lumbermen agree that there is an abundance of trees capable of giving a low grade of lumber, while those producing high are growing scarce.

Some forests might well have been set aside, especially acreages large enough to serve the mills already established. Competitive felling by several mills over a given area has been disrupting; however mills cutting soft wood have generally been more stable than those cutting the hard. Certain traveling mills move on once the mature timber is cut. There are five hundred fifty mills in New South Wales. In addition to these there are mills where oil and tannin are extracted. Eucalyptus oil bought in American drug stores and used to relieve sore throats may come from the leaves of trees in Australia. This oil also is produced on a commercial scale to be used in the refining of lead and zinc. Several barks are used in the tanning of leather.

It is generally believed that the forest acreage of New South Wales should be more than two and a half per cent of the acreage of the state or three fourths of an acre to each inhabitant. New South Wales as well as the rest of Australia has enough forest lands to support a great many more people than it has. An act was passed in 1916 stating that the area of permanent state forests should be not less than 5,000,000 acres. An attempt has been made to reserve nearly 20,000,000 acres in the Commonwealth. Many of the plots chosen were not covered with first class forests. Administrators were handicapped since a definite acreage was allotted to each Division. This meant that good growth was discarded in one Division and poor added in another. These state forests were classified as hardwood, cypress, and miscellaneous brush wood. There were 4,100,000 acres of the first, 750,000 of the second, and 4,500,000 acres of brushwoods. A large acreage of the lower grade

forests can only be regarded as a reserve for the future of growing communities. However, 900,000 acres of the hardwood are capable of producing dense forests of large timber. Of the 198,036,480 acres in the State of New South Wales, 5,311,400 are in state owned forests. The revenue from forests in 1927 amounted to £246,000. Of this amount 193,500 was derived from the standing timber, 27,000 from grazing lands within the area, and 44,500 from districts such as that north of Kempsey, from which trees were cut.

THE BATTLE OF THE AMAZON

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Assistant Coordinator of Inter-American Affairs

The dominating physical fact about Brazil is that it is BIG. With an area of 3,300,000 square miles, it is the fourth largest country in the world, exceeding the territorial span of the United States. It covers nearly half of the South American continent. It is larger than Australia, approximately four-fifths the size of Europe.

And because it is so big, so varied in resources, so relatively undeveloped, it is difficult to talk about Brazil in generalities. It is particularly difficult to draw conclusions about one of the major features of the vast Brazilian expanse—the Amazon River basin. Even in a big country like Brazil, the Amazon basin stands out. The Amazon and its tributaries make the greatest river system in the world. The Amazon is navigable by large vessels more than 2,000 miles upstream, all the way from Belem at the mouth to Iquitos, Peru. The Amazon drains an area almost as large as the United States. This area holds the greatest tropical forests on earth. A large portion of the basin is lowland, flooded part of the year. The Amazon frequently has been called the last great frontier of the Americas. Many regard it as a virgin land of promise. Others view it as a frontier of limited economic possibilities because of the heat, humidity, floods and uncertain agricultural prospects.

Since Spanish explorers first travelled the river more than 400 years ago, the promise of the Amazon has haunted many men. While great fertile lands were available in the temperate zones of North America and south of the Amazon, while the mineral riches of the Andes were more tempting, the Amazon basin attracted relatively few settlers. In 1940, the great state of Amazonas, with an area of 731,000 square miles, had an estimated population of only

about 450,000. Whether the sparsely-settled Amazon basin some day would be able to receive the population overflow of more crowded areas of the world has prompted debate for generations. Today this debate on Man versus the Amazon holds more than academic interest. For, among the big facts about the Amazon, is the fact that it is the largest source of natural rubber immediately available to the United Nations. The Amazon basin generally is conceded to hold uncounted millions of wild rubber trees. Before the rise of the plantation rubber industry in British Malaya and the Netherlands Indies, the Amazon basin was the world's chief source of rubber. At the peak of this production, prior to the First World War, the Amazon basin yielded between 40,000 and 50,000 tons of rubber annually. Now the inter-American rubber development program aims to expand production to around 70,000 tons in 1944 to help cover the loss of rubber supplies in the Far East. This is only a fraction of the rubber formerly imported from the Far East. Yet this goal involves the biggest battle of man with nature the Amazon jungles have seen. The drive for production in the primitive Amazon country may not be as spectacular as the fighting on the war fronts. Still it is an heroic struggle of man against terrific obstacles of nature.

The Amazon basin largely is a primitive country of dense forests, few roads and trails, of equatorial heat. It has one railroad of note. This is the celebrated Madeira-Mamore Railroad, a 228-mile feat of rail construction thru the jungle from Porto Velho to the Bolivian border. It was completed just before the collapse of the first rubber boom to by-pass cataracts and rapids which obstructed river navigation. The construction of this road deep in the Amazon jungles at high cost in human life and toil emphasizes the basic fact about transportation in the Amazon basin. The mighty river itself and its numerous tributaries have been the main avenues of travel and trade.

Meanwhile, since the peak of the first Amazon rubber boom, the airplane has become a swift carrier of passenger and freight. Today the airplane aids man in his struggle against the jungle. By new air routes from the United States, one flies over the green roofs of the forests to the capital of the Amazon rubber country, Manaus, at the junction with the Rio Negro, 1,000 miles upstream. I made this sky trip to Manaus in two days. Straight over jungle buttes, dense forests with outcroppings of granite cliffs which looked like A. Conan Doyle's "Lost World," flew the transport plane. With the aid of radio bearings, we navigated the

uncharted sea of forests, thru stretches of tumbling clouds, until finally the plane dropped down to the dark waters of the Rio Negro at Manaus. And, in the capital of the Amazon rubber country, we sensed the stir of the new battle to get rubber from the jungle and to make the Amazon frontier yield to the will of determined men.

At Manaus the drive for rubber brings into focus the inter-American aspects of this great enterprise. Here, at the docks to meet us, were representatives of United States agencies working closely with Brazilian organizations. These include indispensable organizations of health services and food supplies for the army of tappers who will be required for increased rubber production. At the Manaus dock were Reid Chambers, in charge of the United States Rubber Development Corporation's work in the Amazon; Dr. George M. Saunders, in charge of health and sanitation work for the Institute of Inter-American Affairs; Dr. Kenneth C. Waddell, formerly of the Ford rubber plantations in Brazil, now aiding Dr. Saunders in the Amazon health work; Ken Kadow and Ted Haack, also representatives of the Institute of Inter-American Affairs, working with Brazilians on food supply. And there were others from the United States, working side by side with Brazilians in the battle of the Amazon. These doctors, engineers and agriculturists are the spearhead of the large forces of men who will be needed if we are to get any substantial supply of rubber from the Amazon.

For the Amazon presents a manpower problem as compelling as the manpower problem on our own production fronts in the United States and on the fighting fronts overseas. Every extra ton of rubber from the Amazon requires an additional man or two for the trails to the scattered wild trees, for the handling and shipment of the rubber to ports downstream. Without men to tap the wild trees and to move the rubber, the Amazon basin will remain what it has always been—a land of promise. Now the urgent need for rubber is bringing men into the Amazon, thousands of them. But still unanswered is the old question of whether this last great frontier of the Americas at last is to be tamed by man, with the aid of modern medicine and sanitation, organized food supply and the jungle-vaulting airplane.

From Belem, at the mouth of the Amazon, to Manaus and Porto Velho you will hear men debating the question: is the promise of the Amazon about to come true? As a new-comer, I listened to the oldtimers of the Amazon discuss this question. With my own eyes, I could see the obvious difficulties of colonization: the

forests, the flooded lowlands, the rise and fall of the rivers, the rainy season, the difficulties of transportation and food supply, malaria. At the some time, I knew the forests, besides rubber, held large reserves of vetetable oils, edible nuts, hardwoods. I listened to claims of the Amazon boosters that there are mineral reserves and stretches of good land suitable for agriculture. I heard the argument that once men began to move into the Amazon in larger numbers and to make the forests yield their natural wealth, agriculture would follow and provide food for the increased population. History will decide this debate. Meantime, the drive for rubber goes on.

The quest for rubber has brought the greatest health and food supply programs yet attempted in the Amazon. In this work the Institute of Inter-American Affairs, an agency of the Office of the Coordinator of Inter-American Affairs, is cooperating with special agencies set up by Brazil, Bolivia, Peru, Colombia, Ecuador. In all these countries organization of health services proceeds in the vanguard of the Amazon rubber development. It is an inter-American undertaking to which the Amazon Basin countries and the United States contribute funds, doctors, sanitary engineers, workers and materials toward the common goal of making the rubber country more habitable for man. Malaria, especially, menaces human life in the Amazon. Here the mosquito is a more dangerous foe of man than bullets. Malaria-carrying mosquitoes breed in stagnant pools left by receding waters of the Amazon floods. Energetic sanitation measures can make centers of habitation in the tropics fairly secure against the ravages of malaria. On the grandiose scale of the Amazon basin, malaria control is a health problem of the first dimension. That explains in part why the Rio de Janeiro conference recommended special cooperative health measures to support economic development of hemisphere resources.

In the Amazon, I found the health and sanitation work well advanced. It began last year, soon after the Rio conference. Dr. Saunders and his aides went to Brazil in the spring of 1942 to work with Brazilian health authorities on the Amazon project. Now twenty medical posts have been opened for treatment of the sick. The Amazon work involves the establishment of a chain of hospitals, medical centers, sanitation works running from Belem, at the mouth of the Amazon, to the forested lowlands east of the Andes in Bolivia, Peru, Ecuador, Colombia. Already in remote reaches of the Amazon ply launches which operate as floating

dispensaries carrying doctors, nurses and medical supplies to the rubber workers and their families who live far off the beaten paths of civilization. By the end of 1943 Brazil's SESP, a special agency set up for the health and sanitation work, expects to have a total of fifty infirmaries in operation in the Amazon basin. These will provide the best medical services which ever have been available to the rubber workers. They are a long step forward from the days when the humble rubber tapper battled raw nature in the Amazon without benefit of doctors, nurses, modern drugs and organized food supply. If man conquers this last big frontier of the Americas, certainly he will owe much to the progress of tropical medicine. The lessons the Americas have learned in tropical medicine since the first Amazon rubber boom now are being applied in the attempts to make the Amazon forests more hospitable to man.

From Manaus, I flew in an amphibian transport, heavily loaded with supplies, more than 1,000 miles upstream to Iquitos, headquarters of Peru's health work in the upper Amazon. And there I saw an example of what the doctors and engineers are doing to overcome wartime shortages. Indispensable supplies move in part over the Andes ranges by highway, airplane, canoes and river transport before they finally are laid down in Iquitos. The engineers, consequently, are relying as much as possible upon local materials and equipment. One hospital construction job in Iquitos was being carried out almost entirely with locally-made supplies, including furniture, bricks and tile. Even the hospital blankets were obtained locally. Cedar and mahogany from near-by forests were being used.

Hospital launches were being constructed from the local cedar, with excellent workmanship. One of these launches is named the Nelson A. Rockefeller. It was under construction in a loft two miles from the river. Another of the hospital launches constructed locally is in operation. It is named the General George C. Dunham, after the director of the Health and Sanitation Division of the Institute of Inter-American Affairs. These launches are spotlessly clean. They carry a crew consisting of the captain, mate, engineer and deckhand, in compliance with Peruvian law. Like the heavily-laden air transports which bring doctors and medicines, these hospital launches are symbols of the new struggle to wrest rubber from the Amazon forests with the aid of modern science and technology. If the Amazon frontier is ever to be tamed by man, it will have to be done with the aid of modern medicine, air transport, refrigeration, organized agriculture, machinery. The machine can

fly over the jungle or batter it down to make way for motor transport and for healthful urban centers. The machine has yet to test fully the resistance of the Amazon country.

In the upper Amazon reaches, Brazil is calling upon the machine for aid in opening the country for colonization. This region includes some of the best rubber-producing forests in the Western Hemisphere. By river transport, it is hard to reach. But airports and roads will help open this country. Some rubber men claim it is the finest area for Hevea rubber in the world. This is where the machine counts when man braves the forests.

In the upper Amazon, the food problem also has to be overcome before men in any large numbers can be expected to settle there to gather rubber. Little food has been raised around the towns. The soil in many places is covered with dense jungle and is leached out. Vegetables are brought down from highlands on rafts. Wheat flour has been imported into Iquitos from the United States. What this means during the scarcity of shipping is obvious. Under these conditions, food to nourish the workers becomes just about the number one problem of increasing rubber production.

Ordinarily food could be shipped from surplus-producing areas of the hemisphere. Now the shipping shortage makes increased local food growing expedient in the Amazon, as in other hemisphere areas which have imported food. Brazil's migration of workers into the rubber-producing regions, conceived with the goal of adding at least 50,000 workers, brings a very substantial food supply problem. Moreover, in the heat and humidity of the tropics, i is harder to store and preserve foodstuffs than in cooler and dry climates. Increased local food production is needed, certainly until more ships are available. And this is the approach in the work going on in northern Brazil to increase food production under a joint Brazilian-United States commission.

Even in areas flooded part of the year, there are high spots suitable for growing corn, rice, beans, sugar, vegetables and other staples. Additional land can be worked when the floods recede. I saw an example of this on an island near the junction of the Negro and Solimoes rivers. In high water this land is inundated. The water covers it with a fertile silt. When the water recedes in June, the cleared land can be planted to the low water mark. This allows six to seven months in which to grow crops. In fact, arrangements have been made for increased planting of food crops on the island this year.

Seeds and tools are being distributed to farmers and natives to stimulate food production. Seeds are being distributed in the Rio Branco, Acre and Porto Velho areas, all regarded as potential sources of increased rubber tapping. When I was in the Amazon country, arrangements were being made for introducing plows in the Santarem area. The idea is to work units of men, plows, harrows and animals for loan to farmers. These units will plow for the farmers. And the farmers will receive lessons in the use of the plow. Provision also was being made for the storage of crops, including the sending of silos to food-producing centers. Production of food is only one step in a program directed toward maintenance of food supply in the Amazon. Of equal, and sometimes greater, importance are transportation and storage. This necessitates setting up of warehouses and refrigeration facilities to preserve food.

The food program in Brazil goes beyond the Amazon country and covers production for strategic defense areas, for regions producing strategic materials other than rubber. It includes large-scale victory gardening, distribution of seeds and tools to thousands of farmers in northern and eastern states of Brazil. By latest reports, these measures are bringing about a considerable increase in acreage sown to food crops. But in the Amazon battle food holds special interest. If an army of fighting men moves on its stomach, so does an army of rubber tappers. Traditionally the rubber tapper has lived partly or wholly off the countryside. He has lived by shooting game, by fishing and foraging for edible wild plants. The hunting rifle and fishing gear are still part of the standard equipment of an Amazon rubber tapper. At best this is an uncertain way of life and it does not operate for maximum production of rubber. A man who has to spend part or most of his day hunting and fishing to keep alive cannot be expected to become a maximum rubber producer. An empty stomach and malaria are drawbacks to human efficiency in the Amazon rubber country. At the outset, it is impossible to produce locally all the food requirements for the rubber program. It takes time and organization to increase food supply over so vast an area and on so large a scale. Still a start has been made and the results may count heavily in the outcome of man's battle with nature in the Amazon.

SOME IMPACTS OF WAR ON GEOGRAPHY

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War has brought many unforeseen and sudden impacts on the subject of geography and the life of professional geographers. One impact of major importance actually began while there was only a threat of war. This consisted of the calling to Washington of numerous well-trained geographers for governmental service. This trend speeded up after Pearl Harbor until there are now well over two hundred geographers working in thirteen various branches of the government. Some departments using geographers are The State Department, Department of Agriculture, Office of Strategic Service, and Board of Economic Warfare.

At first this exodus of geographers from college teaching positions or graduate studies caused no concern. With the declining enrollment in the colleges, many geographers were free to accept government positions. Indeed, there was much pleasure in the field at the final large scale recognition by the government of the contribution geographers could furnish governmental affairs. The movement of geographers to Washington would have caused no problem except for the next sudden impact of the war.

Military Recognition

This consisted of the decision of the armed services to include geography as one of the academic subjects, required in some cases, elective in others, to be used in the college program for Military Specialized Training.

Thus thousands and thousands—many times the number of students in geography at the college level in pre-war days—were dumped into the undermanned geography departments, or into colleges and universities where no geography had been previously given. Thus, between the exodus to Washington and the tremendous increase in college level geography enrollment, the shortage of trained geographers has become acute. While all geographers are pleased to have this large scale recognition of the subject from two sources, it is to be hoped all concerned realize the responsibilities as well as the opportunities of the present situation.

CONVERTED GEOGRAPHERS

One reaction to the shortage of geographers has been the drafting of surplus teachers from other college fields to fill in the Armed Service specialized training program. These converted geographers are, by actual report, from geology, Greek, art, philosophy, agriculture and other fields. There are certainly both opportunity and danger in this situation. The danger lies in the possibility that these people cannot, or will not, in many cases, do a job of teaching that will reflect credit on geography. The complaint has already been voiced that geologists are going into advanced phases of that subject in teaching geography to the trainees. An art teacher tangling with an exposition of map projections for the first time is to be pitied, so, likewise, is the exposition of map projections. It will be comforting to geographers to read here that some of the officers in charge of Military Specialist Programs realize that geographers are thinly scattered in the program, a likely explanation for some of the flaws that may develop in the geography work.

Much good may develop out of the use of surplus teachers from other fields in geography. It may be they will develop a better understanding of, and hence respect for, the subject previously lacking. After wrestling with map projections and technicalities of meteorology, they may lose the opinion, seemingly widespread among the uninitiated, that geography is a snap subject. It is possible that some of these people, not too far advanced in graduate study to change, may shift into geography permanently.

SUGGESTIONS

There are some practical things that the geographers left in the colleges may do about the problems mentioned. It has been suggested that one or all the geography organizations, National Council of Geography Teachers, Association of American Geographers, and the American Association of Research Geographers, try to develop a plan whereby the professional geographers available be redistributed so that each school with a Military Specialist Program involving the subject might have at least one geographer to organize and supervise the program. There will be many difficulties: tenure, salary differences, seniority, etc., in carrying out this suggestion, but the good accomplished would no doubt repay everyone involved for the trouble.

Geographers almost unanimously expect great growth of their

subject after the war. Rapid growth after the last war, the tremendous present public interest, and the stimulus of post-war treaties and boundary discussions, all point to the accomplishment of this expectation. It is to be hoped that the quality of geography offered to the Armed Services will be an added factor in sending over a hundred thousand enthusiasts for the subject into private life at the end of the war. If geographers work hard in their own right, and do much extra-curricular work on, and with, the converted geographers, this may well be the case.

If geographers are sincere in the enthusiastic predictions they make for post war growth, they should all begin at once to make plans to take full advantage of the opportunities at all levels of education. While geography is on a fairly good footing at the elementary level, there is much left to be desired at the secondary and college level in attaining the recognition the subject so richly deserves.

EDITORIAL NOTES AND NEWS

A new population map of the United States is now available. The new map, prepared under the direction of C. E. Batchelet of the Bureau of the Census, is based on the population density by minor civil divisions, in 1940. It is in two sheets on the scale of forty miles to the inch and can be obtained from the Government Printing Office, Washington, D.C., for only forty cents. The low cost enables any school to have at least one copy.

A great deposit of beryllium ore has been discovered in southern Oregon. It is rated as one of the world's greatest deposits of this ore. Our supply usually comes from Brazil, Argentina, and South Africa. Beryllium, the metal obtained from this ore, is about one-third the weight of aluminum, is hard, does not rust nor tarnish. Unfortunately, it is brittle, but, if alloyed, the brittleness is lost, without the sacrifice of the other desirable properties. Beryllium-copper alloys are more readily fashioned into some types of guns than those made of steel. Since the alloy does not spark, it is valuable in making safety tools for those industries where a steel tool might cause an explosion. Then, too, since the alloy does not stretch nor lose its spring, it is of special value in making parts of precision instruments. If some process is discovered by which the brittleness can be taken out of the beryllium, it will probably join forces with the other light metals—aluminum and magnesium—in the making of airplanes.

Peru recently acquired two submarine chasers from the United States under Lend-Lease agreements, to help safeguard Pacific sea lanes. This transfer reflects our appreciation of Peru's contribution to the Allied nations. Peru has the world's largest deposit of vanadium, a metal of vital significance in steel production. This mineral, along with copper and manganese, is being sent to the Allies. Peru's rubber and quinine, too, tho relatively small in relation to our vast needs, are helping us win the war.

The Geography and Science Departments of the Rhode Island College of Education, Providence, R.I., recently launched a six-page mimeographed bulletin, issued monthly. The first issue of *Geography-Science Bulletin* features a brief article on the functioning of geography, makes references to current magazine articles and texts of special value, gives directions for the simple apparatus needed for the calculation of sun altitude, and contains news of special value to the teachers in the field served by the College. If interested write to the address noted above.

Marvinol is the trade name of a new material used for the manufacture of automobile inner tubes, elastic gloves, and similar developments. The product is not a synthetic rubber, but a vinyl-type plastic whose basic ingredients are coal, salt, water, and air. Marvinol is impermeable to air, is resistant to acids and alkalis, retains its elasticity and does not tend to oxidize or age. The material can be processed on standard rubber-working machinery, and does not require vulcanization. The elimination of vulcanization makes it possible to reprocess scrap and waste Marvinol by merely putting it back into the mill. The reclaimed product is indistinguishable from that made of basic new materials. At present production is concentrated on war necessities of tubes and surgical gloves.

A snake-repellent grass, *Melinis minutiflora,* is reported by Dr. Henry Morgan, well known for his research in South America. The grass is known as gordura in Venezuela. It exudes an oil distasteful to insects, snakes, and pests. Tick-infested cattle are freed from the ticks after a few days grazing on a pasture of this grass. Moreover,

the Pan American Sanitary Bureau assigns it a high feed value. It yields a heavy crop of hay. People do not find the odor unpleasant.

According to *PAW*, approximately two-thirds of the Middle East crude oil production comes from Iran. It goes by pipe line to the refinery at Abadan, on the Persian Gulf. Other refineries in the Middle or Near East include those at Tripoli and Haifa, on the Mediterranean, supplied by pipe line from the oil fields of Iraq; and on Bahrein Island, in the Persian Gulf, supplied with oil from the Island and from nearby Saudi Arabia.

A new blast furnace was recently put into operation at Monterey, Mexico. Its estimated capacity is 500 tons of iron daily. Its significance is realized from the fact that all of Mexico's iron production will be practically doubled by this furnace's operation.

Parnamirim is rapidly evolving as one of the world's largest and best-equipped air bases. It lies just fifteen miles out of Natal, Brazil. To the east of it is the shortest air line across the Atlantic to Africa. Thousands of our airplanes have used this base on their flight to the war fronts of northern Africa, Sicily, and Italy. Other planes used this airport when scouting for enemy submarines menacing Allied shipping lanes along Brazil's coast.

Forty scholarships in weather forecasting and six in climatology have been awarded to the honor students who recently graduated from the Inter-American Meterological Institute at Medellin. Colombia. About 200 students, representatives from each of the Americas, attended the Institute which was established last February. The honor graduates will attend some of the greatest meteorological study centers in the United States, and then get practical work at our weather stations. Following that they will return to the weather services of their respective countries.

According to the Geological Survey of the United States Department of the Interior, the water situation for our country as a whole was dominantly favorable during the water-year just ended September 30, 1943. Annual runoff was normal or near normal in 59 per cent of the area of the United States, excessive in 31 per cent, and deficient in 10 per cent. Compare this with the drought year of 1934 when stream flow was deficient in 90 per cent of the United States, excessive in 4 per cent, and normal in 6 per cent. A repetition of the water shortage of 1934 would have probably created insurmountable difficulties in the huge production necessitated in the past year's great wartime production. As a consequence of the past year's wetness, ground water storage in most areas not affected by excessive pumping was generally above normal in the northern and Pacific coast states and below normal in the southern states. Storage of water for power is above average in New England but below in New York, and below in the southeast except where new reservoirs have been put into operation. Storage at Fort Peck Reservoir is about twice that of last year while that at Grand Coulee is 102 per cent of last year. Washington and California power storage is very favorable. Irrigation water storage is also favorable thruout the west with the exception of Arizona and New Mexico. The major flood area of 1943 extended from Oklahoma to Michigan. In North and South Dakota the Missouri River rose to the highest stages on record due to rapid snow melting from chinook winds and accompanying ice jams. Floods were most persistent in Oregon. The most destructive flood in point of small area involved, occurred in West Virginia on August 5, where 15 inches of rain fell in two hours causing a flash flood which took twenty-three lives.

GEOGRAPHICAL PUBLICATIONS

Ralph H. Brown. **Mirror For Americans. Likeness of the Eastern Seaboard. 1810.** (American Geographical Society, New York. 1943. 312 pp. 50 figs., $4.00).

This book is a milestone in American geographical literature. It marks progress not only by its scholarship but more particularly for its charming finesse and literary achievement. The volume is, at first glance, an annotated critique of the work of Thomas Pownal Keystone, Esq. who published in the year 1810. Actually Professor Ralph H. Brown, geographer at the University of Minnesota, has written the entire book thru light of the source material available in 1810. Its English is in the dignified style of the period. Then the author has annotated the work in light of the information available today. Thus he has performed a double feat of scholarship. Nor is the achievement merely a quaint trick. It is of high scientific interest and to one of academic training the notes at the end of the volume are a delight. The whole is a lesson in research methodology. The whole is a contribution of first importance to the historical geography of our eastern country in the year 1810.

The first six chapters discuss general aspects of the eastern regions; population, means of travel and maritime activities. Then in turn chapters are devoted to northern border regions, southern border regions, the islands of New York, southern New England, Eastern Pennsylvania, the Chesapeake country and the Carolina low country. The last chapter is a catalogue of the library of the fictitious T. P. Keystone.

Quite in the spirit of 1810 the volume is made possible by three wealthy patrons. This testifies to the obvious importance of the work and to the interest geography is awakening in the layman. Never has this reviewer had greater pleasure in calling attention to a publication of a contemporary.

RODERICK PEATTIE

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William C. Putnam. **Map Interpretation With Military Applications.** 67 pp.; maps, illus., index. McGraw-Hill Book Co., New York and London. 1943.

Norman A. E. Hinds. **Geomorphology, The Evolution of Landscape.** 894 pp.; maps, illus., bibliogr., index. Prentice-Hall, Inc., New York. 1943.

Instructors of cadets in programs including map interpretation may estimate the possible utility of Professor Putnam's manual from a brief content analysis of its four chapters: Contour Maps, 6 pp.; Aerial Photographs, 5 pp.; Geological Interpretation, 18 pp.; and Erosive Processes, 22 pp. Work in map scales is covered in one-half a page; cultural features are referred to in one paragraph; map conventions, grids, and projections are omitted. Wartime instructional requirements are so varied that this arrangement and degree of emphasis may suit, as the preface states, a three-hour, semester course "in map interpretation designed primarily for Army and Navy R.O.T.C. students." For military detachments assigned to study surficial geology, the manual, supplemented by much other material, provides a skeleton outline, but it is inadaptable to the geographical courses usually prescribed for trainees. The first two chapters, tho extremely sketchy, are presented with military implications; the latter two, in contrast, are entirely within the scholastic mold and the possibilities of map interpretition are narrowly conceived.

Professor Hinds' book, "planned for the student and the general reader uninitiated, or nearly so, in earth lore," consists of twenty-two chapters, of which the first four are introductory to the main theme of "land form evolution." Later chapters develop the

topics of rocks, diastrophism, earth sculpture, coasts and submarine features; interspersed with them are chapters on map reading and climate, and portions of still others consider the causes and cures of abnormal soil erosion, and the Tennessee Valley Authority. Here is ample material, in word and illustration, for an extensive college course, and the general reader, too, can find much to satisfy his curiosity.

Careful readers will probably take exception to the title, for the contents of this massive volume place it well within the field of physiography. Whether or not the book is wisely titled, it is abundantly, even lavishly, illustrated with maps, diagrams and pictures. It is estimated that the illustrative matter exceeds the amount of space occupied by the text. The majority of the pictures are startling in their clarity. Captions, in a few instances, call attention to extraneous material. For example, under the close-up view of Grand Coulee Dam (p. 483) one finds the comment that it is located in a young canyon. The caption of the picture on p. 498 conveys the impression that Santa Fe is a Rio Grande city, and Devil's Tower, for generations a favorite picture among physiographers, appears twice (on p. 315 and p. 339). In a book of this magnitude and coverage, all will understand, minor errors and occasional oversights are inevitable.

RALPH H. BROWN

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Norman F. Maclean and Everett C. Olson. **Manual for Instruction in Military Maps and Aerial Photographs.** 138 pp., illust., index. Harper and Brothers, New York and London. 1943.

H. T. U. Smith. **Aerial Photographs and Their Applications.** 372 pp., illust., appendixes, index. D. Appleton-Century, New York and London, 1943.

One of the achievements of America's war preparation, for which, however, no "E" banners are reported fluttering from mastheads, has been the stabilization of the Army training programs in the colleges. At the outset there was some floundering about: with uncertain directions from above, instructors experimented with civilian courses slightly warmed over. Now, it is understood, wholly new courses are required, and competent guidance for the work is eagerly sought.

Guidance, for at least part of the military course, is provided by Maclean and Olson's *Manual,* which has grown out of actual experience. This is an instructor's handbook, outlining the essentials to be covered and the manner of their presentation; moreover, it lists additional manuals, texts, and equipment desirable for the classroom or for the teacher's preparation. The sequence of study units, progressing from the easier to the more difficult, is educationally sound. The cartographic section first takes up conventional signs, then leads into direction, distance, scales, grids and contour maps. There are three units of study relating to aerial photographs and an appendix covering foreign maps. The thoughtful authors even include sample examinations and offer directions for field exercises. There is much wisdom packed in these brief pages, and, if portions seem too elementary, remember that the civilian instructor is expected not only to teach, but also "to learn," his cadets.

Smith's excellent coverage of aerial photographs is suited to more advanced military detachments having ample time for study. Written with a view to the requirements of war-time use of aerial photos, it is at the same time a contribution to principles and methods. The opening chapters are concerned with types of photos and their stereoscopic study; later units are concerned with interpretation. The book is clearly written and is illustrated with many excellent photographs and diagrams. Laboratory exercises are suggested in the appendix. Except for the omission of answers to the problems posed in the body of the text, this book leaves little to be desired.

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